Fiber Optic Temperature Sensors for Thermal Protection Systems, Phase I

Completed Technology Project (2011 - 2012)

Project Introduction

Intelligent Fiber Optic Systems Corporation (IFOS) proposes an innovative fiber optic-based, multiplexable, highly ruggedized, integrated sensor system for real-time measurement and monitoring of temperature in an Ablative Thermal Protection System (TPS). Such measurement will allow for an effective estimation of temperature gradient and subsequent calculation of heat flux. IFOS will initially develop such a system for thermal monitoring in Small Probe applications. However, the technology will readily be applicable to other NASA vehicle applications where TPS is employed. The IFOS fiber optic sensors will incorporate Fiber Bragg Gratings (FBGs). These sensors are extremely light-weight, small, electromagnetically immune, and electrically passive. Multiple sensing FBGs can be fabricated on a single fiber for simplified design and reduced cost. The proposed fiber optic sensing technology is highly sensitive and accurate. It is also low-cost and lends itself to high-volume production. In the Phase I, IFOS will perform a feasibility study of its proposed temperature measurement and monitoring system.

Primary U.S. Work Locations and Key Partners

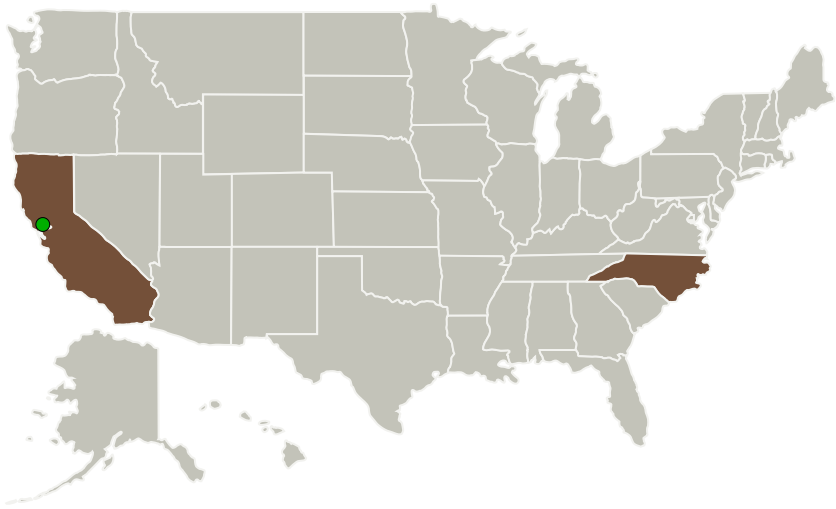

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Table of Contents

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Organizations Performing Work	Role	Type	Location
Intelligent Fiber Optic Systems Corporation	Lead Organization	Industry	Santa Clara, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
North Carolina State University at Raleigh	Supporting Organization	Academia	Raleigh, North Carolina

Primary U.S. Work Locations	
California	North Carolina

Project Transitions

February 2011: Project Start

February 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140240)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Fiber Optic Systems Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Richard J Black

Co-Investigator:

Richard W Black

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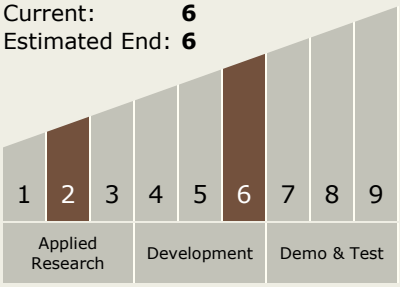
Technology Maturity (TRL)

Start: **2**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.6 Instrumentation and Health Monitoring for EDL

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System